

With the Author's Compt

ON THE

INHALATION OF CHLOROFORM:

ITS

ANÆSTHETIC EFFECTS AND PRACTICAL USES.

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(Read before the Royal Medical and Chirurgical Society of London,
April 22, 1851.)

From the London Medical Gazette.

THERE can be no doubt that the anæsthetic effects of the inhalation of the vapour of chloroform are due to its entering the circulation, and to its being carried by the blood to the vesicular matter of the sensory ganglia, and to the cells, or cell nuclei, at the peripheral extremitiess of the afferent nerves. And while it is reasonable to infer that, in thus circulating with the blood through the encephalon, its presence, like that of any similar morbid agent, must more or less affect all the sensory feelings and psychical manifestations, it is nevertheless abundantly manifest that a kind of elective affinity exists, by virtue of which the vesicular matter of one centre of action becomes affected before that of another; for, during the slow and gradual inhalation of the vapour, the function of sensation is suspended before that of intellectual action,—the *consciousness of feeling* is obliterated, and consequently immunity from pain secured, before *intellectual consciousness* is totally abolished. M. Flourens was, I believe, the first to point out the tendency of certain morbid agents to act primarily and specially on one nervous centre in preference to that of another, by virtue of some special elective affinity between such agents and certain ganglia of the encephalon. Before entering,

however, upon the consideration of the physiological effects of the inhalation of chloroform, it appears to me expedient to premise some observations on the *functions of the nervous centres* themselves, with a view to the better appreciation of its application to practical purposes.

The nervous system of man, in accordance with its office and the nature of its functions, is generally considered to admit of a three-fold division:—into the physical, or excito-motory and reflex,—the nutritive and secretory, or ganglionic,—and the sentient, psychical, and voluntary, or cerebro-spinal system.

It is admitted that there is no point in physiology more clearly made out than that the great hemispherical ganglia are *exclusively* the seat of *perception, and its associate memory*,—the centre of intellectual action, and of all the operations of thought,—“the sole receptacle,” in the language of Cuvier, “where sensations become *perceived and consummated*,” formed into ideas by their ganglionic action, and where the will exerts its power. But comparative anatomy, pathological research, and experimental inquiry, alike establish the position that the cerebrum is neither the seat of *sensation* nor of *motion*. They indisputably demonstrate that the for-

man is seated in the *sensorium commune*, or collection of sensory ganglia, and the latter or motor power in the corpora striata and anterior segmental ganglia of the spinal cord. Sensation or feeling is an act of *simple consciousness*, and sensibility, or the faculty of receiving pleasure and pain, a function of the sensory ganglia. Throughout the whole of the invertebrate sub-kingdom, with the exception of the highest mollusca,—the Cuttle-fish,—the *cerebrum does not exist*; and the conclusion in consequence is inevitable, unless we deny the *consciousness of feeling* to myriads of animals, that sensation or feeling, and consequently pain or pleasure, is an attribute of the *sensorium*, and not of the *cerebrum*. To my mind, Dr. Carpenter has fully established the important position,—“the independent character of the sensory ganglia as instruments of sensation, and of respondent consensual actions and movements;” but *sensation and perception* ought not to be confounded. The functions are perfectly distinct, and have their seat in different nervous centres. The former is *sensorial, and effected through the direct agency of the sensory ganglia: the latter is purely mental, and exclusively cerebral*. The mechanism (so to speak) of their action is different. In *sensation* it is distinct and single; each sensory ganglion, as the seat of its own special sensation, responds directly to the stimulus received or impression made on its ganglionic centre. Thus, in the case of the special senses, each nervous centre is the seat of sensations, *sui generis*, of its own endowment, and which it exercises independently of the cerebrum, for in myriads of animals *no cerebrum exists*; and even in the lower vertebrata, the olfactory, optic, and auditory ganglia have no direct connection with it. But, in *perception*, a double ganglionic action is involved. The various sensations or impressions on the sensory ganglia, as the first step in the process, are transmitted, through commissural connections, to the hemispherical ganglia, and *there*, as the second step, become *perceived and consummated*, converted by the ganglionic action of the cerebrum into ideas, which furnish incentives to intellectual action and materials for thought.

Metaphysically viewed, Sir Wm. Hamilton justly, in my opinion, considers

sensation as identical with *simple consciousness*—a *subjective condition*; and *perception*, as the *consciousness* of the *object* which induced that condition—a recognition of the cause of the sensation as something *external* to the mind itself.

And thus we are necessarily led to the conclusion that, while the cerebrum is the seat of perception and the centre of intellectual action, physical pain or suffering, as a sensational state and subjective condition, has its seat in the sensory ganglia.

Now comparative anatomy and human embryology clearly prove the corpora striata, thalami optici, and corpora quadrigemina, to be distinct cephalic ganglia, each exercising a different function. They, with the nervous centres of the special senses, and the cranio-spinal axis and nerves, constitute the nervous apparatus of automatic life. The *corpora striata* are in direct and continuous commissural connection with the anterior segmental ganglia of the cord, and that they form with them the *motor centres* of the nervous systems, pathological investigation and experimental inquiry have fully established. The *thalami optici* are in like continuous commissural connection with the *posterior segmental ganglia* of the cord, and the evidence is equally conclusive that they are, with these ganglia, the *great centres of tactile and common sensation*. It has been shown, by Dr. Todd and Mr. Bowman, that the same intimate relation subsists between the anterior and posterior ganglia of the cord as exists between the *corpora striata* and the *thalami optici*.

The *corpora quadrigemina* are manifestly not simply the ganglionic centres of vision: some physiologists, indeed, have restricted that function to the *corpora geniculata*. They are evidently the seat of simple emotional impulses, readily excited into action by sight, and quite independently of the cerebrum. In proof of this, it is only necessary to advert to the period of infancy, before the dawning of intelligence. The infant's laughing eye, and its expression of joyous emotion, are familiar to all of us; and not the less so are the effects produced by making strange faces at young children. The fright, scream of alarm, and even fit of convulsion, which have at times been known to follow, are

apt illustrations, and admit of no other explanation. Indeed, it is not to be denied that emotional impulses are excited through all the special senses by impressions *from without*; and in consequence the inference is irresistible, that the sensory ganglia are the *seat* of the emotional feelings, or, in other words, of the feelings of pleasure and pain associated with the emotional states. Dr. Carpenter has ably shown that the true emotions, like the moral feelings and the animal propensities, are of a *composite nature*, involving, with the *sensorial* feelings of pleasure and pain, an *intellectual element*, in all of which the feelings are of *sensorial*, and the ideas of *cerebral origin*.

Now, bearing in mind the distinction which exists between *sensation* and *perception*,—that, in the one case, sensation or feeling is an act of *simple consciousness*, and has its seat in the sensorium commune, or sensory ganglia; and that, in the other, perception is a mental act, and one of *intellectual consciousness*, having its seat in the hemispherical ganglia,—we have next to inquire what are the *feelings* experienced and the phenomena observed during the slow and gradual inhalation of the vapour of chloroform. And on this subject I cannot adduce a greater authority than the testimony of my friend Dr. Snow. No medical practitioner in London has administered the agent so extensively, and under a greater variety of circumstances, nor witnessed and studied its effects more assiduously and carefully, than Dr. Snow has done. He has kindly furnished me with the results of his experience, which I shall give in his own words:—

“The first degree of the influence of chloroform includes all the effects of that agent which a person may experience whilst he still retains a correct consciousness of where he is and what is occurring around him. There are usually numbness and tingling of the surface of the body, singing or other noise in the ears, and dizziness, with not unfrequently a sensation like that of rapid travelling. The feelings are generally described as having been agreeable in this stage.

“In the second degree the patient is no longer conscious of his situation, but the mental functions are not necessarily suspended. He usually appears as if asleep; but if the eyelids be raised,

he will move his eyes in a voluntary manner, and there are occasionally voluntary movements of the limbs. Although generally silent if undisturbed, he may nevertheless laugh, talk, or sing; and it is chiefly, if not solely, in this degree that dreams take place. Violent motorial actions in this dreamy state are sometimes manifested; and when the dreams are remembered, as they occasionally are, such actions are found to have been associated with some quarrel or annoyance. In this disease the loss of sensation is sometimes so complete, especially in children, that the surgeon’s knife may be used without pain: commonly, however, its use at this time occasions expressions indicative of pain, which are either not remembered, or recollect as having occurred in a dream.

“In the third degree the pupils of the eyes are generally somewhat contracted and inclined upwards; the small blood-vessels of the conjunctiva are usually enlarged. There is no longer motion of a voluntary character, but occasionally some rigidity of the muscles, especially in robust persons. Sometimes there is an unintelligible muttering, but never any distinct articulate speech.

“It is seldom necessary to carry the effects of chloroform beyond this degree, for during operations there are usually no signs of pain, and never as it would seem the consciousness of any; for although there are sometimes gestures indicative of feeling, there is never any recollection of pain.

“In the fourth degree the muscles are completely relaxed, the pupils are dilated, and the breathing, hitherto natural, is often stertorous. There is never pain from a surgical operation, nor any sign of it.

“In the fifth degree, as witnessed in the lower animals, the ribs cease to move in breathing, and respiration is performed only by the diaphragm. Spontaneous recovery from this state will yet take place if the inhalation be discontinued, but if continued the breathing will cease, the heart continuing to beat, and its action becoming arrested only for want of the respiration, as in asphyxia. From this state the animal may sometimes be recovered by artificial respiration. This state may be called the sixth degree.

"If an animal is made to breathe air strongly charged with chloroform, so that at the moment when the breathing ceases there is a good deal of the vapour in the lungs, the vapour becoming absorbed in addition to that already circulating in the blood, the heart's action is arrested by the direct effect of the vapour; and this may be called narcotism to the seventh degree."

Dr. Snow justly observes, "that these degrees pass insensibly one into another, so that it is sometimes difficult to say in which of the two contiguous degrees the patient is at the time, and that when the inhalation is discontinued, the effect of the vapours subsides in the inverse order to that in which they had been induced,—for instance, if the narcotism had been carried to the fourth degree, it diminishes to the third, then to the second, afterwards to the first, and finally subsides altogether. On this account the term degree is more appropriate than stage, as the first degree reappears in the last stage of recovery from the influence of chloroform and other narcotics."

Now, from the records of personal experience, and from a careful consideration of the phenomena observed in others, we may trace the following order and sequence in the effects of the inhalation of the vapour of chloroform, properly diluted, upon different nervous centres.

Thus, the first few inhalations are attended with *feelings* which indicate disturbance in the action of the sensory ganglia, as "singing in the ears, a sense of numbness, and tingling of the surface of the body," &c., but which are soon succeeded by a *transient stage* of more general excitement; of delirium in the hemispherical ganglia, for instance,—as singing and incoherent talking, and of excited emotional impulses, and consensual movements in the *sensory ganglia*,—as laughter and uncontrollable motorial actions; this is speedily followed by suspension of the function of sensation,* *the consciousness of feel-*

ing, while as yet some degree of *intellectual activity* remains. Sensorial impressions *from without* are no longer transmitted from the sensory ganglia to the cerebrum; but this "suspension of ordinary sensational impressions, as in sleep, with persistent intellectual activity, is the *typical* characteristic of dreaming;" and dreams often occur. The commissural fibres, between the cerebrum and these ganglia, *Reil's nerves of the internal senses* being still in action, they transmit downwards the *residual intellectual activity* from the cerebrum to the sensory ganglia, and frequently give rise to manifestations, which impress the mind of common observers with the belief of pain and suffering being felt under the knife of the surgeon, while in reality there are none.

The function of the cerebrum as the centre of intellectual action is next suspended; a state of coma is induced, *a complete abolition of consciousness, reducing life to a series of automatic movements*. After this the medulla oblongata and true spinal centres become involved, reflex action is stopped, and breathing by the ribs suspended. The ganglionic system is the last to be implicated; but, with the arrest of the peristaltic action of the heart, life ceases.

Dr. Snow as the result of experience finds that about twelve minims of chloroform on the average are sufficient to produce the first degree of narcotism in the adult, twenty-four minims the second, and thirty-six the third, provided these quantities be inhaled within two or three minutes, and from a suitable inhaler, and not from a sponge or handkerchief.

Although less than one fluid drachm of chloroform has proved fatal from being improperly administered, Dr. Snow considers that an indefinite quantity, for instance an ounce or two, may with safety be inhaled, provided this be done slowly and gradually, and the chloroform be largely diluted with atmospheric

duces directly local anaesthesia of the nervous peripheries, and not only *loss of sensation*, but of the power of reflex excitability also." The local application of chloroform, like that of hydrocyanic acid, induces local anaesthesia, by paralysing locally the peripheries of the nerves. Dr. Sibson, in his admirable address "On the Causes which Excite Respiration," published in the recent volume of the *Provincial Transactions*, has ably traced the direct centric effects of the inhalation of chloroform upon the spinal marrow.

* The inhaled chloroform entering the circulation is conveyed to every part of the system, and not only produces anaesthesia of the sensory and ephalic ganglia, but also of the cells or cell nuclei, at the peripheral extremities of the afferent nerves. In the words of Dr. Sibson, "being applied everywhere to the peripheries of the nerves, it everywhere, so to speak, pro-

air, suspending the process entirely, from time to time, at proper intervals. *The conditions necessary to ensure uniformity of effect and perfect safety to the patient* are, that the chloroform be pure, and the mode of inhalation be slow and regular, with a proper dilution with atmospheric air. When these conditions have been rigidly observed *no fatal case has ever occurred*; and it is truly a matter of surprise, considering the extent to which chloroform has now been employed, and the indiscriminate and injudicious modes at times in which it has been administered, how few are the fatal cases on record.

These solitary, though lamentable instances, admit of a satisfactory explanation, and in no way militate against the use of the agent, while they teach us a most important lesson. Any narcotic, as opium, or belladonna, for instance, is dangerous, and may prove fatal when given in an over dose, and so is chloroform when improperly administered. In the succession of effects, as noticed during its slow and gradual inhalation, the ganglionic system is the *last* in the sequence to become involved, and the contractions of the heart the *last* of the vital actions to be arrested; but the *order* is *reversed* when the lungs have been suddenly overcharged with the *undiluted* vapour, for the patient may die from the direct effects of the chloroform upon the heart before insensibility has been produced, and the nervous centres of the enccephalon affected; nay, the peristaltic action of the heart may cease even before the respiratory movements have been totally abolished. It more generally happens, however, that the arrest is simultaneous of the action of the heart and the lungs, or that the respiratory movements are primarily paralysed, and the patient dies from asphyxia. Still, it is manifestly obvious that the blood in the coronary arteries is far *more highly* charged with chloroform than that in any other part of the system, the lungs excepted, and the instantaneous arrest of the peristaltic action of the heart, as the consequence of an overdose, is an *alarming contingency*, and must have happened in the case which occurred at the Hôtel Dieu, at Lyons, where the heart ceased to beat before the

breathing had stopped. As Dr. Sibson has justly observed, "the chloroform penetrates the heart from the lungs by a single pulsation, and at the beginning of the next systole the blood charged with the vapour is sent through the coronary arteries to the whole of the muscular tissue of the heart," so that the danger to the heart, to its peristaltic action, is great from an overdose, and becomes still more imminent in the case of organic disease.

The great source of danger in the administration of chloroform is this *rapidity* of action when suddenly inhaled *undiluted* without a sufficient intermixture of air; but when the surgeon, to use the words of Dr. Snow, has as distinct an idea of its nature and of its physiological effects as he has of the blade of his knife, he will administer the one with as much safety as he can use the other.

The effects arising from its cumulative property in the system, after the inhalation has been discontinued, are not to be overlooked; but against these, and the danger arising from the rapidity of its action, as it is easy so is it our bounden duty to guard and provide: above all, it is incumbent upon us to see that the play of its action be *carefully and narrowly watched* by a competent *observer*, as an undue protraction of the inhalation may bring the patient to the very threshold of death. The eye of the administrator ought never to be off the face of the patient; for it cannot be denied that chloroform destroys life as certainly as carbonic acid, if respired until the *excito-motor* and *ganglionic* systems come fully under its dominion. But as immunity from pain is found to be persistent for some time after all the other suspended functions have been regained, the inhalation ought not to be unnecessarily prolonged. As the chloroform is again eliminated from the blood, and passes off from the body *unaltered* chiefly by the breath, it may be fairly inferred that it acts in its *integrity as a whole*, and not by its separate elements upon the vesicular matter of the nervous centres, and consequently that beyond the direct and immediate effects produced by its *presence* in the circulation upon these centres, no lasting ulterior or injurious consequences can reasonably be expected to result from

its administration.* And although the range of its action as a therapeutical agent may thus be limited, and its effects transient, present relief from pain is a real boon to the sufferer, and its modus operandi, in regard to the different nervous centres, points plainly enough to the class of medical cases in which its administration has been found to afford great, and often immediate relief.

In neuralgia, by allaying the paroxysmal agony it gives confidence to the mind of the patient, and relieves it of that painful foreboding and sense of depression which the recurrence of the periodic attack is so prone to excite. In spasmotic asthma, when inhaled during the fit, by subduing the spasm it affords present relief. In delirium tremens it has been found a valuable adjuvant to opium and morphia. When opium or morphia, given in full and repeated doses, has failed to procure sleep or to tranquillize the patient, its inhalation has been attended with the happiest results.

The hysterical paroxysm, violent and unmanageable as we are sometimes called upon to witness it, has often by its influence been calmed down "to the

stillness of soft sleep." Temporary relief, and at times more lasting benefit, has resulted from its use, in hysterical and puerperal mania, and especially, in the incubation of that form of mental derangement in which there exists an excited and disturbed condition of the emotional states, and where the great indications are to procure rest, quiet motorial excitement, and to calm fearful apprehensions and despondent feelings. In certain convulsive and spasmodic affections, in puerperal convulsions, chorea, and epilepsy, it has been inhaled with advantage, and even in tetanus it has been thought to be useful. Still it is chiefly if not entirely as ancillary, in such cases, to the adoption of more efficient curative measures, that we can view it in the light of a therapeutical remedy. But in all cases in which the induction of anaesthesia is a desirable procedure, we have in chloroform a most valuable agent, and one which for many obvious and cogent reasons has superseded the use of ether, in surgical and obstetric practice.

A distinguished fellow of this society, the late Mr. Liston, was the first in this country to test the value of *anaesthesia* in the capital operations of surgery. He hailed with enthusiasm the announcement from America, that a new light had burst upon surgery, and that on mankind a large boon had been conferred. "Mr. Liston," says Professor Miller,* struck the key-note, and a pealing note it was: it sounded throughout the length and breadth of the land. The profession were surprised, excited, and charmed in the mass, and more especially those on the junior side of the grand climacteric. The elderly gentlemen had their preconceived and heretofore settled notions sadly jostled and disturbed; not a few grew irritable, and resented the interference; they closed their ears, shut their eyes, and folded their hands; they refused to touch or in any way to meddle with the unhallowed thing: they had quite made up their minds that pain was a necessary evil and must be endured; they scowled on the attempted innovation, and croaked that no good could come of it. On, notwithstanding, has

* Dr. Snow, in his valuable series of papers now in the course of publication in the MEDICAL GAZETTE, has not only shown that the *inspired* chloroform and ether are again exhaled *unchanged* from the blood, but also the important fact that there is a *diminution* of the amount of carbonic acid formed in the system while it is under their influence, and, in consequence, a reduction of the temperature of the body. Maintaining, as he does, "that the animal functions, as sensation, motion, &c., and even intellectual action, are as closely connected with certain processes of oxidation going on the body, as the light and heat of flame are connected with the oxidation of the burning materials in common combustion" he is led to infer that the *specific effect*, which results from the *presence* of chloroform and ether in the blood upon the vesicular matter of the nervous centres, is due to their limiting, and eventually arresting, those combinations between the oxygen of the arterial blood and the vesicular matter, which are essential to sensation, motion, and psychical action,—in other words, to *diminished oxidation in the nervous centres*. It cannot be denied that the *reduction* in the amount of the carbonic acid formed in the system presents us with positive evidence of *diminished oxidation* in the tissues of the body, and that this diminished oxidation is *not* owing to the combination of the chloroform or ether itself with the oxygen of the arterial blood. Dr. Snow has adduced other proofs, besides the important and striking fact, of the elimination of the inhaled chloroform or ether *unchanged* from the blood by the lungs. MEDICAL GAZETTE for April 11th, 1851.

* Principles of Surgery, by James Miller, F.R.S.E.

sped the movement. The thing was too vast, the first impulse too strong, and the promoters too numerous and nimble, to be obstructed." And chloroform is now so universally exhibited, in all the greater and more painful operations of surgery, in our public hospitals and in private practice, that it is unnecessary to dwell upon the subject. Its administration in such cases has become the doctrine of the schools, and it is justly considered as a great boon to operative and dental surgery.

The induction of anæsthesia, and the use of chloroform in midwifery, have given rise to much discussion, and the expression of opposing sentiments. Dr. Simpson, to whom we are indebted for the introduction of chloroform as an anæsthetic agent, has employed it more extensively and successfully in obstetric practice than perhaps any other practitiener in the United Kingdom; but properly and fully to appreciate its value, it is manifestly obvious that we must study its effects in their relation to the physiology of parturition. Now great light has been thrown upon this latter subject, by the researches of two distinguished fellows of this Society, Drs. Robert Lee and Marshall Hall. Well do I remember the time, during the period of my pupillage, when the existence of muscular fibres in the structure of the uterus was the subject of grave discussion; but the revelations of the microscope have set that question, as they are destined to do others, at rest. And to Dr. Robert Lee we are indebted for unravelling and demonstrating the nervous endowments of the uterus, its ganglia, or plexuses. He appeals to nature in confirmation of his views, and what he has seen truly, others will see duly, for nature is consistent with herself.

To Dr. Marshall Hall, as the expounder of the doctrine of reflex action, is due the honour of rendering clear and intelligible much that was previously obscure, if not inexplicable, in the parturient process. His expositions have been more fully appreciated and applied in obstetrics by Dr. Tyler Smith, than by any other writer on midwifery with whose works I am acquainted, though from the passage quoted by him, from the first edition of the Human Physiology, it is evident

that Dr. Carpenter was among the *first* to perceive and appreciate the influence of remote reflex actions in effecting the expulsion of the child from the uterus.

I cannot subscribe to the opinion advocated by Dr. Tyler Smith, that the *muscular excitability* of the uterus, at the period of parturition, is dependent upon *extra-uterine excitement*, and that it is ovarian excitement which induces both the permanent contraction of the uterus, immediately before the coming or of labour, and the tendency to those reflex, emotional, and peristaltic actions by which parturition is completed.* My own mind rests in the conviction that *the primary and normal action of the uterus at parturition is peristaltic*, and exerted through the instrumentality of its own ganglionic nerves, and *not reflex*; while at the same time I am aware of the important influence and active agency of spinal reflex actions in promoting and completing the parturient process.

The cerebro-spinal system, though not an essential, still plays an important part in parturition, for the influence of volition, emotion, and the painful throes of labour, are not to be overlooked. Now in the sequence of effects from the inhalation of chloroform, as the spinal and ganglionic systems, on which the parturient act essentially depends, are the *last* to come under its dominion, we run no risk of interfering with or of arresting their actions, if we use common care and ordinary prudence in its administration. The first effects of the inhalation upon the excito-motory or spinal system, like that upon the other nervous centres, is undoubtedly of an *exciting character*, and is calculated, in consequence, to advance the parturient process. But the continued inhalation, it is not to be forgotten, is attended with *other effects*. And while on the one hand it induces a state of relaxation and dilatation of the passages and outlet which is highly favourable in labour, it is attended, on the other hand, with such a weakened condition of the reflex actions, that the spinal contractions become deficient in expulsive power, and delivery is often not only retarded, but the completion of the process is

* Parturition, and the Principles and Practice of Obstetrics, by Dr. Tyler Smith.

effected chiefly, if not solely, through the activity of the ganglionic system of the uterus itself.

In those cases of labour where we meet with excessive motor action, and at the same time a rigid and unyielding state of the os uteri, passages, and outlet, the advantages arising from the induction of anaesthesia are strikingly manifest. In instrumental midwifery, and in cases of turning, where the patient is nervous, restless, or unmanageable, which sometimes happens, we have a most valuable auxiliary in chloroform. It is not necessary in such instances to carry the inhalation beyond what is required in operative surgery, and less than this will amply suffice in ordinary cases, where our main object is to allay fearful apprehensions, and quiet emotional uneasiness, or to assuage the agony of the last parturient efforts. The fact that immunity from pain may be secured without the suspension of intellectual consciousness, ought never to be

forgotten in obstetric practice. In those cases of abnormal parturition, in which there is a decided want of motor power, the use of chloroform *at all* is a questionable procedure, for, beyond the first exciting effects upon the excito-motory system, its further inhalation may tend rather to aggravate than to remedy the evil in existence. I am strongly inclined to the opinion, that in ordinary and normal labour, *as a general rule anaesthesia is uncalled for*, and in consequence in such cases I have rarely induced the condition. At the same time, it must be admitted that there are other cases, preternatural and instrumental, in which its induction is a most desirable procedure alike to the accoucheur and his patient, and I cannot conclude this communication without giving expression to the opinion, that by the introduction of chloroform into use, Dr. Simpson has conferred a valuable boon upon the obstetric practitioner.

15, Norfolk Street, July 1851.



